Update on Plug Door Simulations

David Kapukchyan

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Quick Update/Info

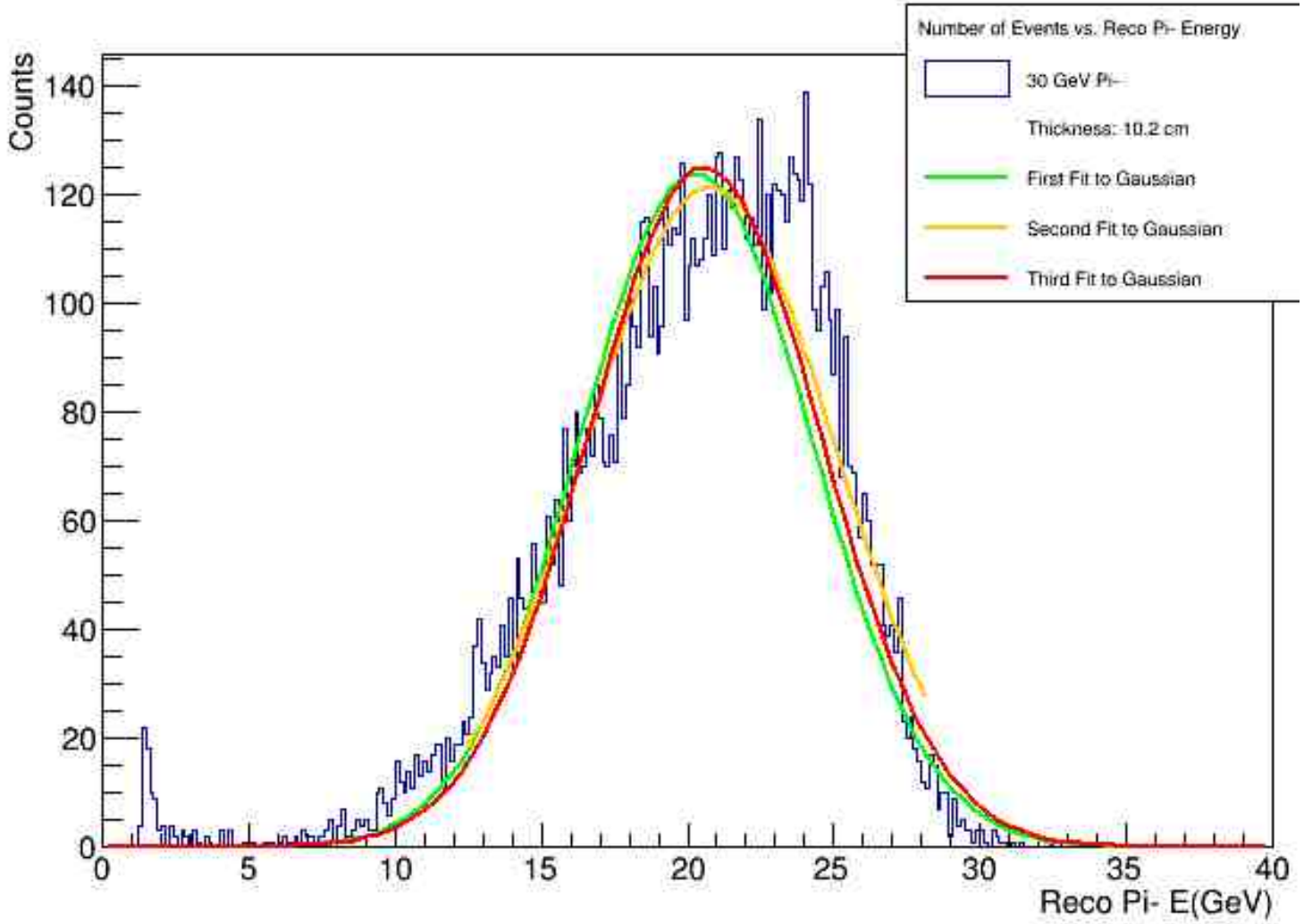
- Purpose is to change plug door dimensions in fsPHENIX detector to see how it affects the energy lost by the particles going through it.
- Ran simulations with π^- going through various thicknesses of the plug door with fixed pseudorapidity(2.0) and fixed energy (30 GeV).
- Also ran simulations with various energies and fixed plug door thickness(10.2 cm) and same fixed psuedorapidity.
- The reconstructed energy from both the EMCAL and HCAL was plotted as a function of counts and various fits were done to this data trying to find the best one.

What I have been working on

- Fit reconstructed energy from EMCAL and HCAL and to a Gaussian
- The first fit is done on the whole histogram and has no range and subsequent fits are between $\mu_{fit} \pm 2\sigma_{fit}$
- Next, Integrate the histogram from 0 to μ_{fit} -2σ and divide by the total area of the Gaussian. This quantity will be called R.
- R will be plotted as a function of the flux return thickness.
- Working on simulations for different energies of π^-
  - Will try 10 GeV and 80 GeV next with all the other parameters the same including the different thicknesses of the flux return

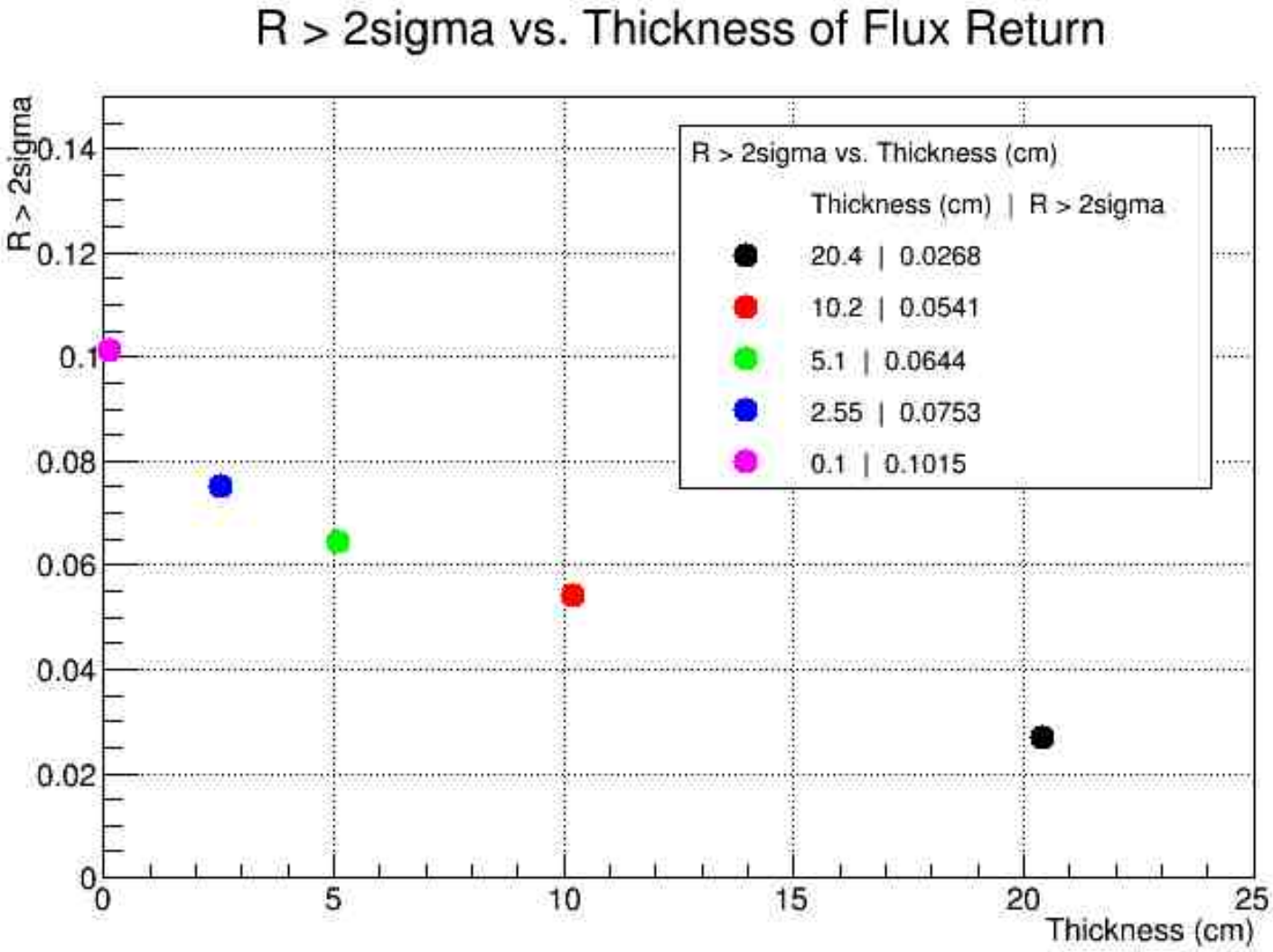
Sample of the Fits

- The plot on the right is for the default plug door length of 10.2 cm
- The First fit has no range and the subsequent fits are between $\mu_{gauss} \pm 2\sigma$
- A total of three fits were performed
- The R for this is ?
- See Backup Slides for the other thickness values



R vs. Thickness

- The plot on the right shows R as a function of the thickness of the plug door
- It should increase as the thickness gets larger but instead It is decreasing as the thickness gets larger.
- The reason for this may be that the tail is being obscured by the Gaussian and as the thickness increases the tail disappears and the distribution becomes more Gaussian



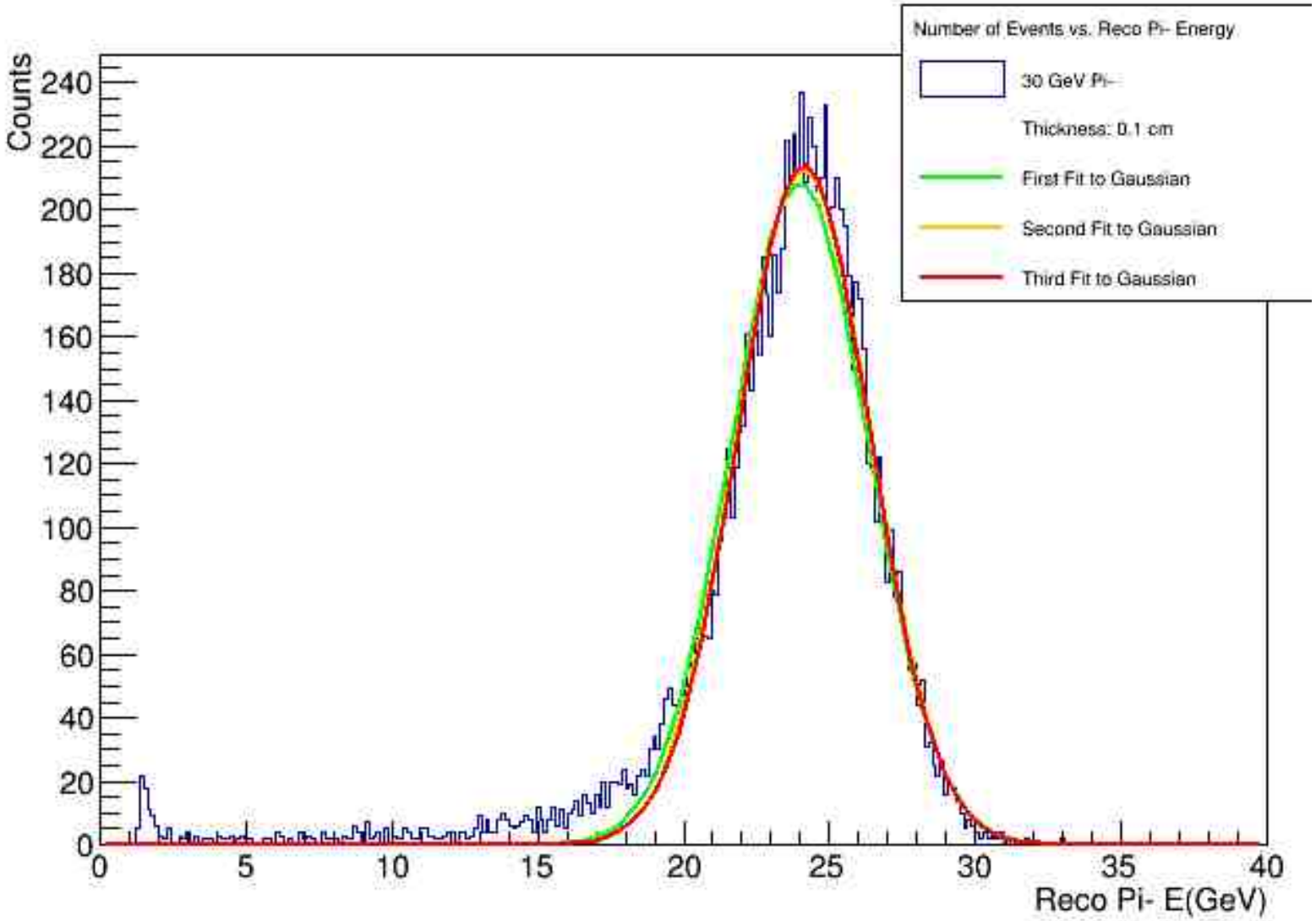
Conclusions and Future Goals

- As was shown the R value was decreasing instead of increasing
- Possible reason is that the tail is obscured by the Gaussian fit
- Will run simulations for different energies in the coming weeks
- Suggestions are welcome

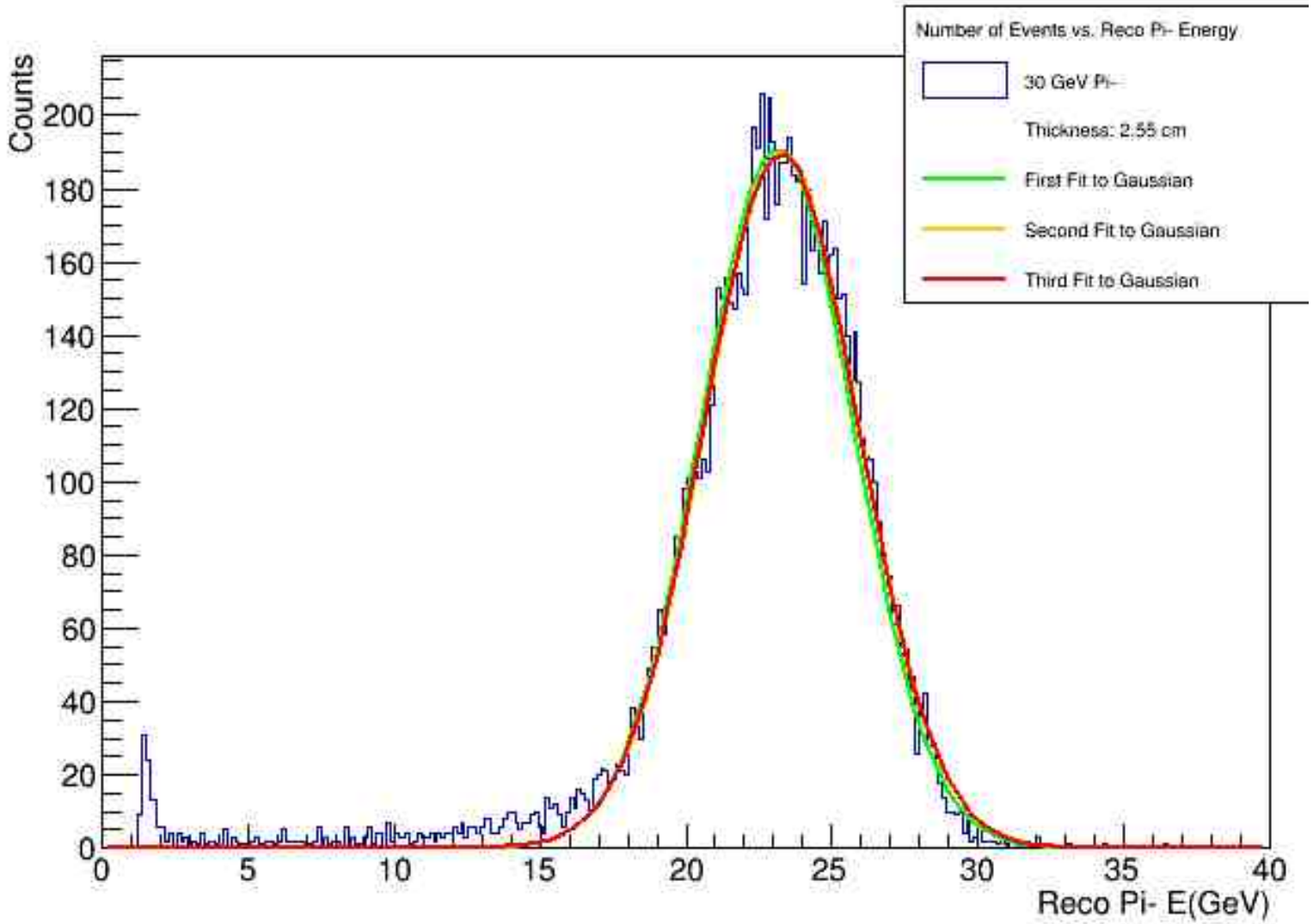
Backup Slides

- The following slides contain the rest of the histograms from the simulations and fitting

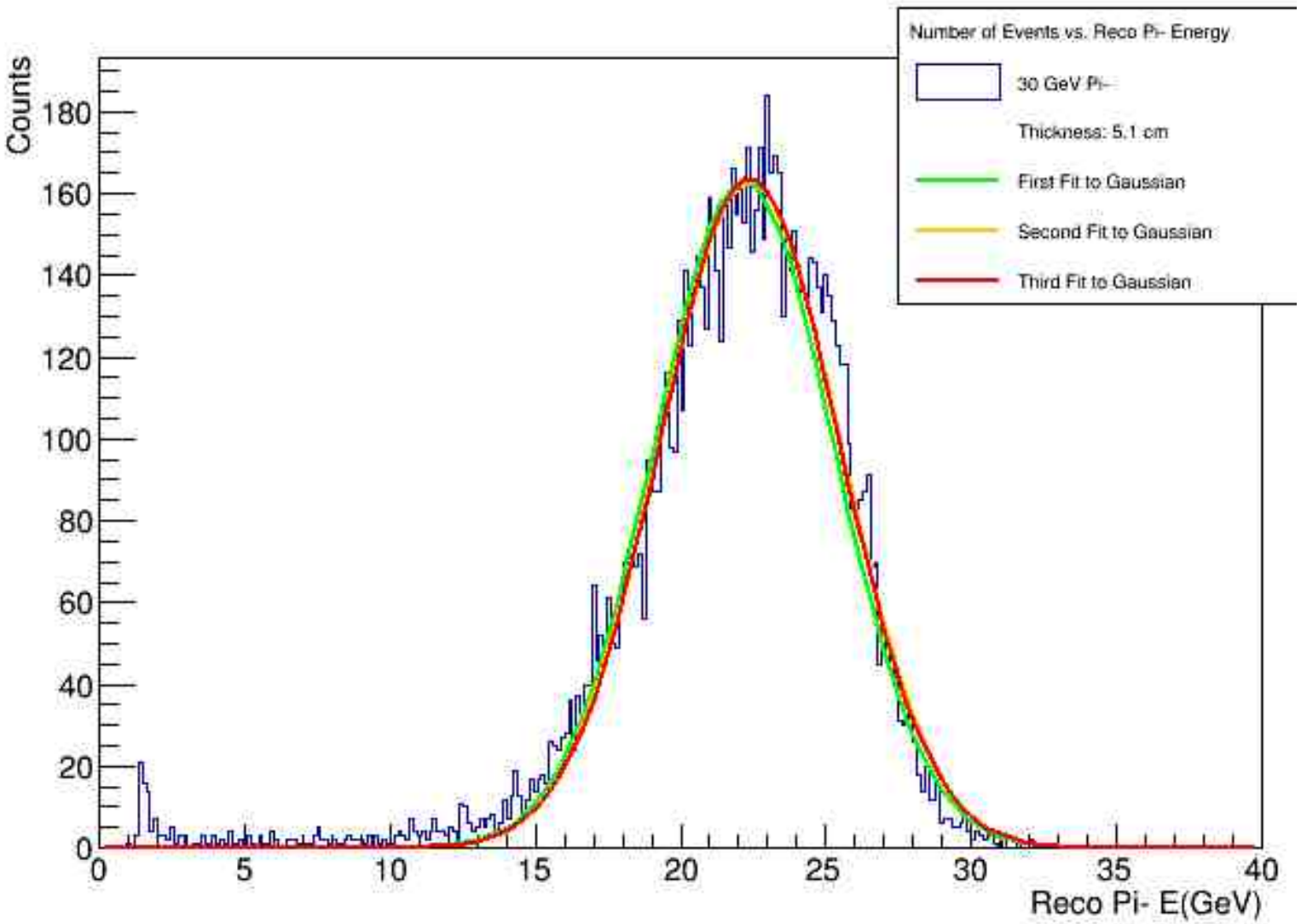
0.1 cm Thickness



2.55 cm Thickness



5.1 cm Thickness



20.4 cm Thickness